

IN THE CLAIMS:

The following is a complete listing of the claims, reflects all changes currently being made thereto, and replaces all earlier versions and listings:

1. (previously presented): An electron-emitting device comprising:
a cathode electrode;
a layer electrically connected to the cathode electrode; and
a plurality of particles, each comprising as a main component a material which has resistivity lower than resistivity of a material of the layer, wherein the plurality of particles are arranged in the layer, and
a density of the particles in the layer is 1×10^{14} particles/cm³ or more and 5×10^{18} particles/cm³ or less.

2. (currently amended): An electron-emitting device comprising:
~~a cathode electrode;~~
~~a layer electrically connected to the cathode electrode; and~~
~~a plurality of particles, each comprising as a main component a material;~~
which has resistivity lower than resistivity of a material of the layer, wherein
the plurality of particles are arranged in the layer, and
according to claim 1, wherein

a concentration of a main element of the particles with respect to a main element of the layer is 0.001 atm% or more and 1.5 atm% or less.

3. (canceled)

4. (currently amended): An electron-emitting device comprising:
a cathode electrode;
a layer which is arranged on the cathode layer and contains carbon as a main component; and
at least two particles which are arranged so as to be adjacent to each other in the layer and each of which comprises metal as a main component, wherein
one of the adjacent two particles is arranged to be nearer to the cathode electrode than the other particle, and
the metal is selected from the group consisting of Co, Ni, and Fe, and
wherein
the layer contains hydrogen of 0.1 atm% or more and 20 atm% or less with respect to the carbon in the layer.

5. (previously presented): An electron-emitting device comprising:
a cathode electrode; and
a layer connected to the cathode electrode, wherein
a plurality of groups of particles, each group being constituted by at least two particles adjacent to each other, are arranged in the layer,
each of the particles comprises as a main component a material which has resistivity lower than resistivity of a material of the layer,
the adjacent two particles are arranged in a range of 5 nm or less,
one of the adjacent two particles is arranged to be nearer to the cathode electrode than the other particle, and
the plurality of groups of particles are arranged apart from each other by a distance equal to an average film thickness of the layer or more.

6. (previously presented): An electron-emitting device comprising:
a cathode electrode; and
a layer connected to the cathode electrode, wherein
a plurality of groups of particles, each group being constituted by at least two particles which comprise metal as a main component and are adjacent to each other, are arranged in the layer,
the layer comprises as a main component a material which has resistivity higher than resistivity of the particles,
the adjacent two particles are arranged in a range of 5 nm or less, and
one of the adjacent two particles is arranged to be nearer to the cathode electrode than the other particle.

7. (canceled)

8. (currently amended): An electron-emitting device comprising:
a cathode electrode; and
a layer which is connected to the cathode electrode and comprises carbon as a main component, wherein
a plurality of groups of particles constituted by at least two particles, which comprise metal as a main component, being adjacent to each other are arranged in the layer,
one of the adjacent two particles is arranged on the cathode electrode than the other particle, and according to claim 6, wherein
graphene is included between adjacent particles among at least part of the plurality of particles.

9. (currently amended): An electron-emitting device comprising:
a cathode electrode;
a layer which is electrically connected to the cathode electrode and
comprises carbon as a main component; and
a plurality of conductive particles arranged in the layer, each particle
comprising ~~carbon metal~~ as a main component, wherein
the layer ~~comprising carbon as a main component~~ contains a hydrogen
element of 0.1 atm% or more and 20 atm% or less with respect to a carbon element.

10. (currently amended): An electron-emitting device according to claim 9,
wherein the layer comprising carbon as a main component contains a hydrogen element of
1 atm% or more and 20 atm% or less with respect to the carbon element.

11. (canceled)

12. (previously presented): An electron-emitting device according to claim
1, wherein surface unevenness of the layer is smaller than 1/10 of its film thickness in rms.

13. (previously presented): An electron-emitting device according to claim
1, wherein the layer comprises carbon as a main component.

14. (currently amended): An electron-emitting device according to claim 4,
wherein an average concentration of hydrogen with respect to carbon in the layer is $[[0.1]]$
1 atm% or more and 20 atm% or less.

15. (previously presented): An electron-emitting device according to claim 4, wherein the layer comprising carbon as a main component has an sp^3 bonding.

16. (previously presented): An electron-emitting device according to claim 1, wherein the particles comprise metal as a main component.

17. (previously presented): An electron-emitting device according to claim 6, wherein the metal is metal selected from Co, Ni, and Fe.

18. (previously presented): An electron-emitting device according to claim 1, wherein the particles comprise monocrystalline metal as a main component.

19. (previously presented): An electron-emitting device according to claim 1, wherein the particles have an average particle diameter of 1 nm or more to 10 nm or less.

20. (previously presented): An electron-emitting device according to claim 1, wherein the layer has a thickness of 100 nm or less.

21. (previously presented): An electron-emitting device according to claim 1, wherein at least two adjacent particles among the plurality of particles are arranged 5 nm or less apart from each other.

22. (currently amended): An electron-emitting device according to claim 4, wherein a density of the particles in the layer is 1×10^{14} particles/cm³ or more and 5×10^{18} particles/cm³ or less.

23. (currently amended): An electron-emitting device according to claim 1, wherein a density of the particles in the layer is 1×10^{15} particles /cm³ or more and 5×10^{17} particles /cm³ or less.

24. (previously presented): An electron-emitting device according to claim 4, wherein a concentration of a main element of the particles with respect to a main element of the layer is 0.001 atm% or more and 1.5 atm% or less.

25. (previously presented): An electron-emitting device according to claim 1, wherein a concentration of a main element of the particles with respect to a main element of the layer is 0.05 atm% or more and 1 atm% or less.

26. (previously presented): An electron-emitting device according to claim 1, wherein:

the plurality of particles are arranged dispersedly in the layer as a plurality of groups of particles, each group being constituted by at least two adjacent particles, one of the two adjacent particles are placed to be nearer to the cathode electrode than the other particle, and

the plurality of groups of particles are arranged apart from each other by a distance equal to an average film thickness of the layer or more.

27. (previously presented): An electron-emitting device according to claim 1, wherein the surface of the layer is terminated with hydrogen.

28. (previously presented): An electron-emitting device according to claim 1, further comprising:

an insulating film which is arranged on the cathode electrode and has a first opening; and

a gate electrode which is arranged on the insulating film and has a second opening, wherein

the first opening and the second opening communicate with each other, and the layer is exposed in the first opening.

29. (previously presented): An electron source, wherein a plurality of the electron-emitting devices according to claim 1 are arranged.

30. (original): An image display apparatus, characterized by comprising the electron source according to claim 29 and a light-emitting member which emits light by being irradiated with electrons.

31. - 40. (canceled).

41. (previously presented): An electron-emitting device comprising:

a cathode electrode; and

a layer electrically disposed on the cathode electrode, wherein

a plurality of particle groups comprising at least two adjacent particles are discretely distributed in the layer,

the particle comprises as a main component a material which has resistivity lower than resistivity of a material of the layer,

one of the adjacent particles is closer to the cathode electrode rather than the other(s) of the adjacent particles, and

the adjacent particles are disposed within a distance of 5nm.

42. (previously presented): An electron-emitting device according to claim 41, wherein the layer comprises carbon as a main component.

43. (previously presented): An electron-emitting device according to claim 42, wherein the layer contains hydrogen.

44. (previously presented): An image display apparatus comprising a plurality of electron-emitting devices and a light emitting member emitting light by irradiation with an electron emitted from the electron-emitting device, wherein the each of the electron-emitting devices is the electron-emitting devices according to claim 41.

45. (canceled)

46. (currently amended): An image display apparatus comprising a plurality of electron-emitting devices and a light emitting member emitting light by irradiation with an electron emitted from the electron-emitting device, wherein each of the electron-emitting devices is an electron-emitting device according to claim [[45]] 2.